APPLICATION FOR UNITED STATES

LETTERS PATENT

CONTENT CONVERTER PORTAL

Inventor:

Jukka HEISKA
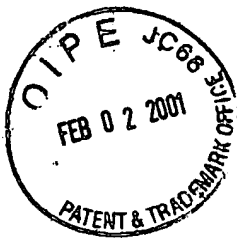
BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to wireless devices connected to the Internet, and particularly to conversion of content among a variety of wireless devices connected via the Internet to a wide variety of content providers.

2. Description of the Related Art

As wireless communication devices become more common and become adapted for data communication as well as voice communication, Wireless Application Protocol (WAP) has been specified for data applications by leading telecom and software vendors. A goal of the WAP specification has been to create an open standard that will enable creation of value-added services that can be used with wireless terminals and with server products from various vendors.

The WAP specification defines a set of content formats that are used in creation of the wireless services. In principle, WAP enables content conversion from existing Internet content formats to WAP-defined content formats. Also, since WAP is intended to be an open specification, in principle it ensures that content written according to its specifications will be usable on various terminal types from various manufacturers.

However, it has been found that in practice it is very difficult to ensure usability of services when content is converted among various formats and as various terminals implement browser characteristics in different ways. Thus, difficulties arise from differences among the

2

capabilities of various languages used in content creation, and differences among various types of mobile terminals (e.g., different screen sizes and layouts, input methods, processing capabilities, etc.). Furthermore, a user might prefer individual or idiosyncratic variations in content format.

5   There is thus a need to adjust conversion of content according to a user's terminal type and according to the user's individual preferences.

SUMMARY OF THE INVENTION

In a system comprising a data network with at least one content server and at least one gateway connected to it and including a mobile telephone network for communicating between mobile terminals and the gateway, the invention provides a content converter accessible to the network and a method of routing data content through the content converter where it is adjusted according to previously uploaded indications of characteristics of a mobile terminal and then forwarded to a gateway for forwarding to the mobile terminal.

In an aspect of the invention, data content is in WAP format.

In another aspect of the invention, the data network is a wide-area network (WAN).

In another aspect of the invention, the data network is the Internet.

In another aspect of the invention, content is further adjusted according to previously uploaded indications of user preferences.

Other objects and features of the present invention will become apparent from the following detailed description considered in conjunction with the accompanying drawings. It is to be understood, however, that the drawings are designed solely for purposes of illustration and not as a definition of the limits of the invention, for which reference should be made to the appended claims. It should be further understood that the drawings are not necessarily drawn to scale and that, unless otherwise indicated, they are merely intended to conceptually illustrate the structures and procedures described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein like reference numerals denote similar elements:

Fig. 1 is a network diagram showing mobile terminals communicating through WAP providers to the Internet in a conventional manner;

5   Fig. 2 is a network diagram in which is introduced mobile terminals communicating through WAP providers to the Internet according to the present invention; and

Fig. 3 illustrates data flow through particular ones of the elements depicted in Fig. 2.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENTS

Fig. 1 is a network diagram illustrating mobile devices communicating over the intent to content providers in a conventional manner. A plurality of users are each equipped with mobile terminals 100. Three such terminals are shown, and a dotted line is employed in Fig. 1 to

5   connote that a larger number may actually exist. Associated with each mobile terminal 100 is terminal characteristics 102 and user preferences 104. A mobile terminal 100 may communicate over mobile telephone network 10 to another mobile terminal 100 or to a WAP provider 200. Those in the art appreciate that a WAP provider 200 may be organized either as a proxy or as a gateway. WAP providers 200 communicate via Internet 20 with content providers 300, such as

10   web servers. Content from a content provider 300 is typically returned in wireless markup language (WML) format, perhaps translated to WML at the provider 300 from the hypertext markup language (HTML) typically provided to wired terminals on the Internet 20. Conversion of the content for delivery to mobile devices 100 is accomplished by content converters 202 associated with WAP providers (gateways or proxies) 200. Content converters 202 provide

15   encoding and decoding for efficient data transmission and deliver content via mobile telephone network 10 to mobile terminals 100 in a form that should be intelligible on a broad range of device types; the content, however, may not be entirely appropriate for certain device types, and may not conform with user preferences.

Fig. 2 is a network diagram wherein some of the WAP proxies and gateways are provided

20   according to the present invention. A number of prior-art WAP providers 200 may still exist, but Fig. 2 is distinguished by the addition of WAP providers 210 and of central content converter

6

400. WAP providers 210 do not need to be equipped with content converters 202. Content

converter 400 is addressable by a uniform resource locator (URL) and thus is accessible to mobile

terminals 100 as a centralized network resource. Mobile terminals 100 upload terminal

characteristics and user preferences to central content converter 400. User preferences may be

5   uploaded according to a current usage scenario, or may be preloaded and then selected according

to a current scenario.

Fig. 3 depicts content flow according to the prior art and according to the present

invention. A particular one of mobile terminals 100, here designated 100-1, is in communication

through mobile network 10 to a particular one of WAP providers 200, designated 200-1, which in

10   turn is in communication through Internet 20 with a particular content provider 300-1. Content

requested from 300-1 is sent via Internet 20 to WAP provider 200-1 which employs its internal

content converter 202. Content, put in generic WAP format by content converter 202, is passed

through mobile phone network 10 to mobile device 100-1.

Another particular mobile terminal 100-2 is making use of the present invention. The user

15   of terminal 100-2 would previously have uploaded to central content converter 400 a profile of

characteristics 102-2 of the particular terminal 100-2 which are stored in database 402, along with

characteristics of other terminals 100 that are using the invention. Similarly, the user of terminal

100-2 has previously uploaded to content converter 400 a profile of preferences 104-2, which are

stored in database 404 along with preferences of other users of terminals 100 using the invention.

20   The user of mobile terminal 100-2 requests content from content provider 300-2. The

requested content is forwarded from content provider 300-2 via Internet 20 to central content

converter 400. The content is nominally in a form which might produce an intelligible display on user terminal 100-2, but as previously noted the particular characteristics of some terminals may not be cooperative. Also, the user may prefer a format other than that preordained in the content. Central content converter 400 adjusts the content according to the profile of terminal

5   characteristics 102-2 stored in database 402, and according to the profile of user preferences 104-2 stored in database 404, and forwards the content through Internet 20 to WAP provider 210-2, which in turn forwards the content through the wireless telephone network 10 to user terminal 100-2.

The present invention permits vendors to introduce new forms of content with no need to

10   distribute appropriate conversion programs to a plurality of WAP servers. The conversion can simply be incorporated into central content converter 400.

Thus, while there have been shown and described and pointed out fundamental novel features of the invention as applied to a preferred embodiment thereof, it will be understood that various omissions and substitutions and changes in the form and details of the devices

15   illustrated, and in their operation, may be made by those skilled in the art without departing from the spirit of the invention. For example, it is expressly intended that all combinations of those elements and/or method steps which perform substantially the same function in substantially the same way to achieve the same results are within the scope of the invention. Moreover, it should be recognized that structures and/or elements and/or method steps shown

20   and/or described in connection with any disclosed form or embodiment of the invention may be incorporated in any other disclosed or described or suggested form or embodiment as a general

matter of design choice. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto.